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# **In the United States Patent and Trademark Office**

In re the Application of:

Steven Edward Atkin )  
Serial Number: 09/891,341 ) Group: 2654  
Docket Number: AUS920010642US1 ) Examiner: Angela A. Armstrong  
Filed on: 06/26/2001 )  
For: "Bi-Directional Domain Names" )

## **APPEAL BRIEF**

*(First Reinstatement)*

### ***Real Party in Interest per 37 CFR §41.37(c)(1)(i)***

The subject patent application is owned by International Business Machines Corporation of Armonk, NY.

### ***Related Appeals and Interferences per 37 CFR §41.37(c)(1)(ii)***

None.

### ***Status of Claims per 37 CFR §41.37(c)(1)(iii)***

Claims 1 - 15 are finally rejected. The rejections of Claims 1 - 15 are appealed.

### ***Status of Amendments after Final Rejections per 37 CFR §41.37(c)(1)(iv)***

Claims 1, 5, and 9 were amended after the first set of final rejections in order to correct typographical errors which led to rejections under 35 U.S.C. §112. Subsequently, examination was reopened, leading to the final rejections over new grounds, which are appealed.

***Summary of the Claimed Subject Matter per 37 CFR §41.37(c)(1)(v)***

The invention solves a need in the art for a system and method which allows domain names to be handled and displayed with different (non-English) reading orders. The invention is readily usable within the currently deployed technologies of the World Wide Web, and compatible with existing methods and systems such as Unicode's BiDi algorithm. In order to provide this solution, the invention unambiguously determines the display order of multilingual domain names by implementing the correct semantics of the full stop "." or "dot" character, as well as the hyphen-minus "-" character as used within domain names, and providing a one-to-one logical order to display order conversion function. Each domain name is broken into a plurality of individual labels separated by the full stop character, and each individual label is independently evaluated for proper bidirectional display order. The resulting mapping of logical order to display order provides unambiguous resolution of multilingual domain names.

More specifically, claim 1 sets forth a method for accomplishing this solution as follows:

- (a) establishing a plurality of labels within a unidirectional domain name by using a pre-determined full stop punctuation mark as a delimiter between said labels, said labels having an original label display order as encountered from left to right (pg. 17 lines 9 - 16 );
- (b) within each said label, performing inferencing through resolving the direction of indeterminate characters by assigning a strong direction left or right to each indeterminate character (pg. 22 line 3 - pg. 23 line 3); and
- (c) reordering said characters within each said label of said unidirectional domain name into character display order using the fully resolved characters previously inferred (pg. 22 lines 3 - 8; Table 3; pg. 25 line 12 - pg. 26 line 15), thereby converting said uni-directional domain name to a bidirectional domain name in which said original label display order is preserved, and bidirectionality of characters within each label is produced (pg. 7 lines 1 - 10; pg. 25 line 18 - pg. 26 line 4).

Claim 5 sets forth a computer readable medium encoded with software (pg. 8 lines 12 - 15) for accomplishing this solution, wherein the software performs the steps of:

- (a) establishing a plurality of labels within a unidirectional domain name by using a pre-determined full stop punctuation mark as a delimiter between said labels, said labels having an original label display order as encountered from left to right (pg. 17 lines 9 - 16 );
- (b) within each said label, performing inferencing through resolving the direction of indeterminate characters by assigning a strong direction left or right to each indeterminate character (pg. 22 line 3 - pg. 23 line 3); and
- (c) reordering said characters within each said label of said unidirectional domain name into character display order using the fully resolved characters previously inferred (pg. 22 lines 3 - 8; Table 3; pg. 25 line 12 - pg. 26 line 15), thereby converting said uni-directional domain name to a bidirectional domain name in which said original label display order is preserved, and bidirectionality of characters within each label is produced (pg. 7 lines 1 - 10; pg. 25 line 18 - pg. 26 line 4).

Claim 9 sets forth a system for accomplishing this solution including:

- (a) a label definer adapted to establish a plurality of labels within a unidirectional domain name by using a pre-determined full stop punctuation mark as a delimiter between said labels, said labels having an original label display order as encountered from left to right (pg. 17 lines 9 - 16 );
- (b) an inferencer adapted to, within each said label, resolve the direction of indeterminate characters by assigning a strong direction left or right to each indeterminate character (pg. 22 line 3 - pg. 23 line 3); and
- (c) a character reorderer adapted to reorder said characters within each said label of said unidirectional domain name into character display order using the fully resolved characters previously inferred (pg. 22 lines 3 - 8; Table 3; pg. 25 line 12 - pg. 26 line 15), thereby converting said uni-directional domain name to a bidirectional domain name in which said original label display order is preserved, and bidirectionality of characters within each label is produced (pg. 7 lines 1 - 10; pg. 25 line 18 - pg. 26 line 4).

***Grounds for Rejection For Which Review is Sought per 37 CFR §41.37(c)(1)(vi)***

Review by the Board is requested of the rejections of Claims 1 - 15 under 35 U.S.C. §103 as being anticipated by U.S. patent 6,738,827 to Abir (hereinafter "Abir") in view of US Patent 6,944,820 to Feinberg (hereinafter "Feinberg").

***Arguments per 37 CFR §41.37(c)(1)(vii)*****Rejections of Claims 1 - 15 under 35 U.S.C. §103 over Abir in view of Feinberg**

Independent claims 1, 5, and 9 were amended to specifically recite the function of the invention in which a URL or web address is broken into "labels" by parsing it at points where "full stop" characters appear. Full stop characters are characters in natural language that often are used to end a sentence, for example, but in URL's and web addresses, they are used as delimiters of sorts. For example, the web address:

<http://www.anycompany.com>

which has two full stop characters in it, the first following "www" and the other preceding "com". As such, a first label determined by Appellant's invention would be "http://www", a second label would be "anycompany", and a third label would be "com", according to our invention.

In the rationale for the final rejections, the Examiner addresses these claim elements, steps and limitations by interpreting Abir's disclosure at col. 4 lines 22 - 42 and col. 6 lines 14 - 31 as anticipating this claimed step, element or limitation under 35. U.S.C. §102(e).

Appellant points out that neither passage actually discusses using the period or "dot" character as a delimiter, nor does either passage mention breaking the entirety of the web address into labels between the full stop characters.

In another example which illustrates the difference between Appellant's claims and Abir, consider the web addresses:

<http://www.help.ibm.com> (1)

and

http://help.servers.ibm.com (2)

Appellant's invention, as claimed, would break the first address into four labels according to the full stop character placement: (a) http://www, (b) help, (c) ibm, and (d) com. Likewise, appellant's invention, as claimed, would bread the second address into four labels as such: (a) http://help, (b) servers, (c) ibm, and (d) com.

Now, consider the passages relied upon for the rejection from Abir:

1. Conversion Algorithm. Referring now to FIG. 1, there is illustrated the "conversion" algorithm for transforming a conventional resource identifier into a friendly resource identifier. (For purposes of this disclosure of this preferred embodiment of the transformation algorithm, the set of characters of the non-Latin written language used are the Hebrew characters.) In step 100, standard parts of conventional resource identifiers such as "http://www" "com" and "htm" are identified. In step 102, the standard parts are converted to well-known Hebrew equivalents such as  $\text{HTTP}$  for "http://www" and  $\text{בז}$  for "com". In step 104, the remaining parts of the conventional resource identifier is analyzed for words that have identifiable meanings. For example, the words "health" and "insurance" would be recognized in the word "healthinsurance". In step 106, the Hebrew word  $\text{בריאות}$  would be substituted for "health" and the Hebrew word  $\text{ביטוח}$  would be substituted for insurance. In step 108, the complete Hebrew resource identifier would be produced.

**Abir col. 4 lines 22 - 42**

1. On the fly strictly URL translation from Latin to native  
15 language address system. Surfers that arrive at locations that  
are not a part of the portal address assignment system (that  
is, any Web site located on the World Wide Web) will also  
see in the URL box their own native language rather than  
Internet protocol. When the surfer, whether through a portal  
20 or through the use of the desk top based option, arrives at  
non-system users Web site, the transformation algorithms  
will operate. For example, the address in the case of the  
address <http://www.healthinsurance.com>, the system will  
25 isolate the part of the address that comes after "http://www"  
and before the ".com" (also after the ".com" for sub sites.)  
The system will then convert the words into the Web surfer's  
native language using the system's simple English Hebrew  
30 dictionary. In this case health insurance. Then the system  
may reverse the order of the Hebrew words add the Hebrew  
variation of the "http://www" and the ".com", and display  
the address in the surfer's native language.

**Abir col. 6 lines 14 - 31**

Please notice that there is no mention in either of these passages of using the period character "." or a full stop character for parsing, but instead Abir's system "isolates the part of the address that comes after the 'http://www' and before the '.com' ". So, in example number (1) above, Abir would not create four labels as we have claimed, but would "isolate" the string "help.ibm". In the second example, Abir would not create four labels, either, but instead would fail because no "http://www" appears in the address (e.g. 'www' is omitted).

Appellant has also specifically pointed out patentable differences between Abir and the originally filed claims, that, for reference during consideration of reply remarks, a domain name or Universal Resource Locator ("URL") is defined by those in the industry as having a protocol identifier (e.g. http or https, etc.), a top-level identifier (e.g. .com, .org, .net, etc.), a registered domain server name or second-level identifier, an optional third-level identifier (e.g. www, www2, etc.), zero or more subdomains, zero or more subdirectories, and zero or more resource names.

For example, in the URL:

<http://www.support.ibm.com/index.htm>

The protocol identifier is “http://” for hypertext transfer protocol, the top-level identifier is “.com”, the registered domain server name with extension is “ibm”, the subdomain is “support”, the third-level identifier is “www”, and the resource is the HTML document named “index.htm”. Each of these portions of the domain name is separated by a Latin period “.” character, except for the protocol identifier and the optional third-level identifier.

It is possible to have sub-subdomains, such as the following where “linux” is the subdomain of the subdomain of “support”:

<http://www.linux.support.ibm.com/index.htm>

Note that a period “.” character is used again to delimit the sub-subdomain from the third-level identifier “www” and the subdomain “support”.

Abir, however, teaches a first step or phase of converting an English or Latin-based domain name by identifying pre-determined “standard parts”, as Abir calls them, of a URL, such as the strings “http://www”, “.com”, or “HTM” (see figure 1 #100, col. 4 lines 29 - 31). These “standard parts” are exchanged for alternate language (e.g. Hebrew in their example) strings of characters (fig. 1 #102, col. 4 lines 31 - 36), which are not compatible with the Internet Protocol or Domain Name Server protocols.

In other words, Abir first converts any top-level portions, third-level portions, file extensions, and protocol identifiers to pre-determined alternate language characters or strings.

Especially note that absolutely no parsing of the URL is specified by Abir, but just finding of pre-determined “standard portions” is disclosed. These can be referred to as “standard portions” by Abir because there are a finite set of options for these portions of a URL (e.g. http, ftp, www, .com, .org, .edu., .gov, .co, .htm, .php, .jsp, .html, etc.)

Then, Abir teaches treating the entire set of characters which are not “standard parts” as a string to be converted to the alternate language using word-for-word conversion, and letter-for-letter conversion when words are not recognized. Abir discloses reversing the order of words if the alternate language is a right-to-left interpreted language.

Please also note that Abir is silent as to maintaining the original order of the subdomains and domain names, and is silent as to using the “.” character as a full stop character while independently reordering the characters within each portion between the full stop characters.

When applying conventional natural language translation techniques, a Latin period “.” character is typically interpreted as signaling the end of a sentence construct within a paragraph, unless it is immediately followed by a paragraph termination character, such as a hard line feed (“LF”) or carriage return (“CR”) character. So, for example, if the *words* of the phrase:

“I own a dog. It is a good dog. <CR>”

were re-ordered for right-to-left languages and interpreted using conventional natural language translation techniques, it would appear in the following order:

“.dog good a is It. dog a own I.”

Notice that the *sentences* reversed order, as well as the words within the sentences. This is a fundamental problem of the Unicode Bidirectional Algorithm (“BIDI”) as applied to domain names, which arises due to the fact that the algorithm was designed to process natural language text (e.g. sentences and paragraphs), not URLs. This is also a problem unrecognized and unsolved by Abir, as Abir is silent regarding processing of the portions *between full stop delimiters*.

For example, using the Unicode BIDI process or Abir process, the following URL:

<http://www.applyforaloan.bigbank.com>

would be recognized as two sentences, and would be reordered for right-to-left readers as follows (including character reordering):

<A>knabgib.naolarofylppa<B>

where <A> is Abir’s substitution for “http://www”, and <B> is Abir’s substitution for “.com”. Note that the reversal of the order of the “sentences” has now made the domain name incorrectly ordered (e.g. “bigbank” became a subdomain, and “applyforaloan” became a domain name).

Our invention, however, first parses the URL by using a full stop character (e.g. ".") as a delimiter between "labels". So, in the example of:

http://www.applyforaloan.bigbank.com

Our invention would find four "labels" in this example URL:

Label\_1 = "http://www"

Label\_2 = "applyforaloan"

Label\_3 = "bigbank"

Label\_4 = "com"

The characters *within each label* are then re-ordered according to right-to-left reading order for recognized words in the target alternate language, independent of the content of the other labels:

Label\_1' = "http://www"

Label\_2' = " naolarofylppa"

Label\_3' = "knabgib"

Label\_4' = "com"

Because Appellant's invention *preserves the original order of the labels* (e.g. doesn't treat them as sentences within a paragraph as the Unicode process does), the proper relationship of the portions of the URL are preserved while the characters within the portions are reversed for right-to-left reading:

http://www.naolarofylppa.knabgib.com

Abir is silent as to parsing the URL into labels using a full-stop character as a delimiter between labels, reordering of the characters *within each label*, and producing a URL having the labels in the original order of the original URL, but with the reordered characters within the

labels. Appellant's first amendment clarified and specified this difference.

In summary, Abir teaches handling of URLs by separating out "standard portions" and then translating everything in between the standard portions as if it were natural language text, not dividing the URL into labels according to full stop characters as label delimiters, preserving the original order of the labels, and reordering characters within labels, as we have claimed. Thus, Appellant previously requested under appeal reversal of the rejections, and allowance of claims 1, 5, 9, and 13 - 15.

In response to the first Appeal Brief, the examiner reopened examination, withdrew the previous rejections under §102 over Abir alone, and issued new rejections of all claims under §103 over Abir in view of Feinberg.

Examiner's rationale for what Abir teaches was essentially the same as in the previous rejections, relying upon the erroneous interpretations by Abir's disclosure at the foregoing quoted portions (col. 4 lines 22 - 42 and col. 6 lines 14 - 31).

However, the examiner added to the rationale that "parsing text into sections based on detected delimiters was well known in the art of natural language and text processing" (page 3, lines 6 - 7 of the Office Action). Immediately following this statement, the examiner has discussed the teachings of Feinberg.

There is no statement, however, why Feinberg was employed in a §103 combination. What, in the examiner's opinion, does Abir not teach? Apparently Abir is silent as to something that is claimed, or the examiner would have maintained the rejections under §102 over Abir alone. Or, is Feinberg added for good measure to illustrate "what is well known in the art"?

Appellant requests reversal of the rejections at least on the basis that the examiner has not fully explained the rationale for the rejections, and thus a *prima facie* case of obviousness has not been established.

Further, Feinberg is most certainly addressed to natural language processing, but URL's are not "natural language" in the sense that Feinberg addresses natural language. The period characters, or full stop characters, in a URL do not delimit full sentences of "spoken language" (col. 1, line 18).

And, the period delimiter "." is not the same as a "neutral character" such as a hyphen "-", which is the basis on which Feinberg processes natural language (col. 1, line 55 and 66), nor are periods "." interpreted the same way in a URL as they are in spoken language, such as European

Terminators and Separators (col. 2, lines 3 - 6).

So, Feinberg is not directed towards handling URLs and converting them appropriately, as the Appellant has claimed, but instead Feinberg converts natural languages in a word processor document (col. 6, lines 14 - 22) looking for neutral characters, such as a dash "-" (col. 6 line 33), and if one is found, the user is prompted by highlighting the questionable text and prompting for input as to the direction the text should read (e.g. right to left, left to right, etc.). (col. 6, lines 34 - 37, col. 7 lines 3 - 18). As such, Feinberg is not a fully automated bi-directional text processing system (as Appellant's claims are fully automatic), but instead is a tool which requires user interaction to complete its task.

Therefore, Feinberg is silent regarding applying any part or form of their invention to URL's, and silent as to an automated method or machine for properly handling bidirectional URLs. And, Abir is silent regarding applying word-processing style natural language processing.

As such, the proposed Abir in view of Feinberg combination fails to teach all of the claimed steps, elements and limitations. And, there is no motivation, suggested by either Feinberg or Abir, to combine their elements as proposed. Finally, since neither Abir or Feinberg explains *how* such a combination should be made (because neither even suggests it), then any combination of Abir and Feinberg would not be enabling to one of ordinary skill in the art.

For these reasons, Appellant requests reversal of the rejections of claims 1 - 15, and allowance of all claims.

Respectfully,



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**Claims Appendix**  
*per 37 CFR §41.37(c)(1)(viii)*  
**Clean Form of Amended Claims**

**Claim 1 (previously presented):**

A method for converting a unidirectional domain name to a bidirectional domain name, said method comprising the steps of:

establishing a plurality of labels within a unidirectional domain name by using a pre-determined full stop punctuation mark as a delimiter between said labels, said labels having an original label display order as encountered from left to right;

within each said label, performing inferencing through resolving the direction of indeterminate characters by assigning a strong direction left or right to each indeterminate character; and

reordering said characters within each said label of said unidirectional domain name into character display order using the fully resolved characters previously inferred, thereby converting said uni-directional domain name to a bidirectional domain name in which said original label display order is preserved, and bidirectionality of characters within each label is produced.

**Claim 2 (original):**

The method as set forth in Claim 1 wherein said step of inferencing comprises the steps of:

first, assigning a right-to-left direction to Arabic and Hebrew letters;  
second, assigning a left-to-right direction to full stop characters and other alphabetic characters;  
third, resolving the directions of digits; and  
fourth, resolving the directions of hyphen-minus characters.

**Claim 3 (original):**

The method as set forth in Claim 2 wherein said step of resolving the directions of digits comprises the steps of:

assigning a right-to-left direction to all Arabic numerals; and  
assigning a left-to-right direction to all European numerals, unless a European numeral is surrounded by right-to-left characters such as Arabic or Hebrew letters, in which case it is assigned a right-to-left direction.

Claim 4 (original):

The method as set forth in Claim 2 wherein said step of resolving the directions of hyphen-minus characters comprises:

assigning a left-to-right direction to all hyphen-minus characters which are not surrounded by characters whose direction is right-to-left; and

assigning a right-to-left direction to all hyphen-minus characters which are surrounded by characters whose direction is right-to-left.

Claim 5 (previously presented):

A computer readable medium encoded with computer executable software for converting a unidirectional domain name to a bidirectional domain name, said software when executed causing a computer to perform the steps of:

establishing a plurality of labels within a unidirectional domain name by using a pre-determined full stop punctuation mark as a delimiter between said labels, said labels having an original label display order as encountered from left to right;

within each said label, performing inferencing through resolving the direction of indeterminate characters by assigning a strong direction left or right to each indeterminate character; and

reordering said characters within each said label of said unidirectional domain name into character display order using the fully resolved characters previously inferred, thereby converting said uni-directional domain name to a bidirectional domain name in which said original label display order is preserved, and bidirectionality of characters within each label is produced.

## Claim 6 (original):

The computer readable medium as set forth in Claim 5 wherein said software for inferencing comprises software for performing the steps of:

- first, assigning a right-to-left direction to Arabic and Hebrew letters;
- second, assigning a left-to-right direction to full stop characters and other alphabetic characters;
- third, resolving the directions of digits; and
- fourth, resolving the directions of hyphen-minus characters.

## Claim 7 (original):

The computer readable medium as set forth in Claim 6 wherein said software for resolving the directions of digits comprises software for performing the steps of:

- assigning a right-to-left direction to all Arabic numerals; and
- assigning a left-to-right direction to all European numerals, unless a European numeral is surrounded by right-to-left characters such as Arabic or Hebrew letters, in which case it is assigned a right-to-left direction.

## Claim 8 (original):

The computer readable medium as set forth in Claim 6 wherein said software for resolving the directions of hyphen-minus characters comprises software for performing the steps of:

- assigning a left-to-right direction to all hyphen-minus characters which are not surrounded by characters whose direction is right-to-left; and
- assigning a right-to-left direction to all hyphen-minus characters which are surrounded by characters whose direction is right-to-left.

Claim 9 (previously presented):

A system for converting a unidirectional domain name to a bidirectional domain name comprising:

    a label definer adapted to establish a plurality of labels within a unidirectional domain name by using a pre-determined full stop punctuation mark as a delimiter between said labels, said labels having an original label display order as encountered from left to right;

    an inferencer adapted to, within each said label, resolve the direction of indeterminate characters by assigning a strong direction left or right to each indeterminate character; and

    a character reorderer adapted to reorder said characters within each said label of said unidirectional domain name into character display order using the fully resolved characters previously inferred, thereby converting said uni-directional domain name to a bidirectional domain name in which said original label display order is preserved, and bidirectionality of characters within each label is produced.

Claim 10 (original):

The system as set forth in Claim 9 wherein said inferencer comprises:

    a first direction assignor for assigning a right-to-left direction to Arabic and Hebrew letters;

    a second direction assignor for assigning a left-to-right direction to full stop characters and other alphabetic characters;

    a third direction assignor for resolving the directions of digits; and

    a fourth direction assignor for resolving the directions of hyphen-minus characters.

Claim 11 (original):

The system as set forth in Claim 10 wherein said third direction assignor comprises:

    a right-to-left direction assignor for all Arabic numerals, and for all European numerals which are surrounded by right-to-left characters such as

Arabic and Hebrew letters; and

a left-to-right direction assignor for all European numerals which are not surrounded by right-to-left characters such as Arabic or Hebrew letters.

Claim 12 (original):

The system as set forth in Claim 10 wherein said fourth direction assignor comprises:

a left-to-right direction assignor for all hyphen-minus characters which are not surrounded by characters whose direction is right-to-left; and

a right-to-left direction assignor for all hyphen-minus characters which are surrounded by characters whose direction is right-to-left.

Claim 13 (previously presented):

The method as set forth in Claim 1 wherein said pre-determined full stop punctuation mark used as a delimiter between said labels comprises a Latin period punctuation mark.

Claim 14 (previously presented):

The computer-readable medium as set forth in Claim 5 wherein said pre-determined full stop punctuation mark used as a delimiter between said labels comprises a Latin period punctuation mark.

Claim 15 (previously presented):

The system as set forth in Claim 9 wherein said pre-determined full stop punctuation mark used as a delimiter between said labels comprises a Latin period punctuation mark.

**Evidence Appendix**  
*per 37 CFR §41.37(c)(1)(ix)*

No evidence has been submitted by applicant or examiner pursuant to 37 CFR §§1.130, 1.131, or 1.132.

**Related Proceedings Appendix**  
*per 37 CFR §41.37(c)(1)(x)*

No decisions have been rendered by a court or the Board in the related proceedings as identified under 37 CFR §41.37(c)(1)(ii).